REMARKS/ARGUMENT

In the most recent Office Action, claims 22-32 were examined. Claims 22-32 stand rejected, and the rejection has been made final. Claims 22, 25, 28 and 31 are amended. No new matter is added.

Claim Rejections – 35 U.S.C. §112

Claim 28 is rejected under 35 U.S.C.§112, first paragraph, because, the Office Action alleges, the specification does not enable any person skilled in the art to which it pertains or with which it is most nearly connected, to make and use the invention. In particular, the Office Action states that the specification does not teach filtering a data file prior to a wavelet transform step. Applicants respectfully traverse the rejection.

The standard for determining whether the specification meets the enablement requirement is whether any experimentation to practice the invention is undue or unreasonable. Mineral Separation v. Hyde, 242 U.S. 261, 270 (1916). "The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation." The United States v. Telectronics, Inc., 857 F2d 778, 785, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988). A patent need not teach and preferably omits what is well known in the art. In re Buchner, 929 F2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991) (other citations omitted).

The Office Action states on page 7 in section 9 that, "[t]he Examiner agrees with the applicant that filtering is well known..." Accordingly, it is clear that filtering a data file, whether before or after a wavelet transformation step is well within the ordinary skill of the art, and can be accomplished without undue experimentation. Applicants respectfully submit that one skilled in the art would therefore be able to make and use the claimed invention using the application as a guide. In re Brandstadter, 484 F2d 1395, 1406-07, 179 USPQ 286, 294 (CCPA 1973). Applicants therefore strongly urge that the rejection of claim 28 under 35 U.S.C. §112, first paragraph, for lack of enablement, is inappropriate as to the present invention containing a claim recitation for filtering the data file prior to a wavelet transformation step, since it is well known within the art, as agreed upon in the Office Action, does not require undue experimentation, and

one of ordinary skill in the art can easily understand filtering of the data file prior to a wavelet transformation step using the application as a guide. Applicants thus respectfully request that the rejection of claim 28 under 35 U.S.C. §112, first paragraph, be reconsidered and withdrawn.

Applicants have amended claim 28 to recite the selection of an image filter prior to a wavelet transformation step. However, this amendment has been made only for the purpose of reflecting a particular embodiment described in the specification that Applicants have a right to claim. The amendment is not made for any reason related to patentability, and therefore should not affect the scope of the claim, especially with regard to enablement of the claimed invention, as discussed above.

Claim Rejections – 35 U.S.C. §103

Claims 22 – 24 and 31 – 32 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kolarov et al. (U.S. Patent 6,144,773). Claims 25-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kolarov et al. in view of Ferriere (U.S. Patent No. 5,880,856). Claims 27 and 29 – 30 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kolarov et al. in view of Ferriere and Said et al. (An Image Multiresolution Representation for Lossless and Lossy Compression, IEEE Transactions on Image Processing, Vol. 5, No. 9, September 1996). Claim 28 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kolarov et al, and further in view of Ouyang et al. (U.S. Patent No. 5,835,145). The rejections are respectfully traversed. In each of the above rejections, the reference by Kolarov et al. is used as the main reference in establishing a *prima facie* case of obviousness, and appears to be the main obstacle to patentability for claims 22 – 32. The reference by Kolarov et al. is cited for the first time in the most recent Office Action.

Applicants note that claims 22 and 31 are modified to more clearly state the subject matter that the claims already contain. The changes are not made for any reason related to patentability or for any reason related to the prior art. In addition, the recitation of the operation of the thresholding step is stated and inherent in the original claims, and therefor neither changes the claim scope nor introduces any change in the content of the claim. Entry is respectfully requested.

With regard to the present invention, it is first noted that the main feature of the present invention is that wavelet coefficients can be derived from an image represented by a number of bit sets, or data elements, with each of the data elements typically having the same number of bits. The wavelet coefficients that are derived from the image represented by the data elements are themselves represented by a number of bits that are no more in number than the number of bits used to represent each of the data elements. This central feature of the present invention permits fast and compact transformation from data elements to wavelet coefficients, and is undisclosed in any of the cited prior art references. In independent claims 22, 31 and 32, Applicants have specifically recited that each wavelet coefficient is "represented by a number of bits having a maximum count no greater than a number of bits representing each of said data elements." Accordingly, Applicants would like to specifically focus the examination of the present invention on this particular feature, and call to the Examiner's attention the fact that this feature is undisclosed in any of the cited prior art references.

In the Office Action, the Examiner states that Kolarov et al. disclose "performing a wavelet transformation of the data file to provide a series of wavelet coefficients, each of the coefficients being represented by a number of bits having a maximum count no greater than a number of bits representing each of the data elements." The Examiner cites Figures 3a and 4a – 4c, as well as the description by Kolarov et al. at col. 19, line 19 – col. 20, line 13. In reaching this conclusion, the Examiner states only that the feature recited in the claims is provided by Kolarov et al., and relies on particular portions of that disclosure for support.

A review of Figure 3a and Figures 4a – 4c of the disclosure by Kolarov et al. reveals that the compression operations and procedures discussed are conducted on wavelet coefficients, rather than on pixels or other image representations. That is, the algorithm disclosed by Kolarov et al., especially in Figures 4a – 4c, focuses on operations performed ***after*** wavelet coefficients have already been obtained. Kolarov et al. reveal nothing with respect to obtaining the wavelet coefficients other than conventional techniques. Instead, Kolarov et al. explain how to reorganize and process wavelet coefficients that are obtained as a result of conventional wavelet transforms. It is the wavelet coefficients themselves that are processed in the zero-tree coding modification presented by Kolavov et al. as the central part of their invention, which provides a technique for ordering significant bits (represented by S(N)) to obtain the maximum amount of

detail for a transferred representation in the shortest amount of time. This operation has nothing whatsoever to do with the generation of the wavelet coefficients themselves. Kolarov et al. only explain that for each bit plane that is output, significance bits are determined that correspond to wavelet coefficients according to the G-tree hierarchy disclosed by Kolarov et al. In short, Kolarov et al. never in fairness discuss a relationship between the number of bits in a data element and the number of bits in a wavelet coefficient derived from the image representation. At most, Kolarov et al. give an example of how to generate significance bits to optimize transfer of information representing a function defined upon a selected geometric manifold. No relationship between the number of bits in a data element and the number of bits in a wavelet coefficient is even mentioned, let alone discussed in any meaningful way.

Indeed, the Office Action refers to the disclosure by Said – Pearlman that is incorporated by reference into the disclosure by Kolarov et al., which also reveals the information discussed in the disclosure by Kolarov et al. at col. 19, line 19 – col. 20, line 13, as cited in the Office Action. A copy of the reference by Said – Pearlman is enclosed for the Examiner's reference. In particular, Kolarov et al. reference Algorithm II of Said – Pearlman as being analogous to the algorithm disclosed in Figures 4a – 4c (col. 19, lines 25-32 and lines 55-64). Even a cursory examination of the reference by Said – Pearlman discloses that it is the conventionally obtained wavelet coefficients that are manipulated to transfer the maximum amount of information, i.e., the bits of significance, in the shortest amount of time. See section VI of Said – Pearlman, beginning on page 8. It is apparent that the disclosure by Kolarov et al. draws almost exclusively on the reference by Said – Pearlman to obtain an algorithm for generating significance bits as applied to a new type of data representation for a function on a manifold. Again, neither Kolarov et al. nor the reference by Said – Pearlman disclose a wavelet transformation wherein each of the wavelet coefficients are represented by a number of bits that are no greater in number than the number of bits representing each of the data elements of the data file.

Applicants therefore note that, although the Office Action makes conclusory statements about the disclosure by Kolarov et al., the reference does not actually support such conclusions. In effect, the Examiner has not provided appropriate evidence of obviousness as required to establish a *prima facie* case of obviousness. With regard to rejections under 35 U.S.C. §103, "***the Examiner must provide evidence*** which as a whole shows that the legal determination

sought to be proved (i.e., the reference teachings establish a *prima facie* case of obviousness) is more probable than not (emphasis added)." In the instance at hand, the Examiner has stated only that:

> [p]erforming a wavelet transformation of the data file to provide a series of wavelet coefficients, each of the coefficients being represented by a number of bits having a maximum count no greater than any number of bits representing each of the data elements

is provided by Kolarov et al., citing Figures 3a and 4a – 4c, and col. 19, line 19 – col. 20, line 13, which is merely the legal determination sought to be proved. Because the Examiner has not met the burden of providing evidence that the legal determination of *prima facie* obviousness is more probable than not, Applicants respectfully submit that the rejections of claims 22 – 32 is overcome. With regard to claims 22 – 24 and 31 – 32, Kolarov et al. is the only cited reference. With regard to claims 25 – 26, the combination of the disclosure by Kolarov et al. with that of Ferriere does not provide the feature of wavelet coefficients represented by a number of bits that are no greater in number than the number of bits representing the data elements of the data file. Accordingly, claims 25 – 26 are patentable over the disclosures by Kolarov et al. and Ferriere, either alone or in combination. With regard to claims 27 and 29 – 30, the combination of Kolarov et al. with Ferriere and Said et al. also fails to disclose wavelet coefficients that are represented with a number of bits that are no greater in number than the number of bits representing each of the data elements of the data file. Accordingly, claims 27 and 29 – 30 are patentable over the disclosures by Kolarov et al., Ferriere and Said et al., either alone or in combination. With regard to claim 28, the disclosures by Kolarov et al. and Ouyang et al. fail to disclose the feature of wavelet coefficients that are represented by a number of bits that are no greater in number than the number of bits representing each of the data elements of the data file, either alone or in combination. Accordingly, claim 28 should be patentable over the disclosures by Kolarov et al. and Ouyang et al.

In view of the above discussion, Applicants respectfully submit that claims 22 –32 are patentable over the cited prior art references, either alone or in combination, and respectfully

request that the rejection of claims 22 –32 under 35 U.S.C. §103(a) be reconsidered and withdrawn. As an aid to understanding the nature of the key features of the present invention, Applicants further attach herewith a discussion by the first named inventor of the present invention, Dr. Hongyang Chao, for review by the Examiner. Applicants submit that none of the cited prior art references disclose or even suggest the novel approach by the inventors to reduce the representation size of the wavelet coefficients in accordance with the size of the data elements of the represented data file. Accordingly, Applicants respectfully believe that a *prima facie* case of obviousness cannot be established as against the present invention recited in claims 22 – 32 in view of the disclosures of the cited prior art references.

Response to Amendment

The Office Action states that the amendment to page 33, lines 17-20 was not entered, because it would have created another problem. Applicants have presented an amendment to the last paragraph on page 33, lines 18 – 20, to correct the problem of a repeated phrase. Entry is respectfully requested.

The Office Action further states that the 112/1 rejection was not overcome. Applicants have submitted new arguments to overcome the rejection. Entry is respectfully requested.

CONCLUSION

Applicants respectfully believe that the foregoing is a complete and accurate response to all issues raised in the most recent Office Action. The independent claims remain unamended as it is believed that they recite patentable subject matter, and thus do not raise any new issues or require further search. In view of the above discussion and amendments, Applicants respectfully believe that the present application is now in condition for allowance, and earnestly solicits notice to that effect. If it is believed that an interview would contribute to allowance of the

claims, the Examiner is requested to contact the undersigned counsel at the number provided below.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Assistant Commissioner of Patents and Trademarks, Washington, D.C. 20231, on July 26 2002:

Brendan Kennedy
Name of applicant, assignee or
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Respectfully submitted,

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APPENDIX B

VERSION WITH MARKINGS TO SHOW CHANGES MADE
37 C.F.R. § 1.121(b)(iii) AND (c)(ii)

SPECIFICATION:

Paragraph at page 33, line 18 to page 33, line 20:

Similarly, if we take $\{h^0, \tilde{h}, g, \tilde{g}^0\}$ as an initial set of biorthogonal filters, a new set of biorthogonal filters $\{h, \tilde{h}, g, \tilde{g}\}$ can be found as [can be found as]

CLAIMS:

22. (Amended) A method of compressing a data file having data elements each represented by a number of bits, comprising:

performing a wavelet transformation of the data file to provide a series of wavelet coefficients, each of said coefficients being represented by a number of bits having a maximum count no greater than a number of bits representing each of said data elements;

discarding wavelet coefficients that fall below a predetermined threshold value;

quantizing [those] remaining wavelet coefficients which fall above a predetermined threshold value to provide a quantized series of wavelet coefficients; and

compressing the quantized series of wavelet coefficients to provide a compressed data file.

25. (Amended) The method of claim 23 further comprising the step of performing a color transformation of the data file prior to the wavelet transformation step.

28. (Amended) The method of claim 22 further comprising the step of [filtering the data file] selecting an image filter prior to the wavelet transformation step.

31. (Amended) A compressed data file comprising:

a wavelet transformation of a data file having data elements each represented by a number of bits;

wavelet coefficients produced by said wavelet transformation being represented in said compressed data file, wherein said wavelet coefficients are each determined with a number of bits that are no greater in number than said number of bits representing each of said data elements;

said represented wavelet coefficients having a value above a predetermined threshold value; and

said represented wavelet coefficients being quantized and compressed to form a series of compressed, quantized wavelet coefficients in said compressed data file

[a series of compressed, quantized wavelet coefficients included in said wavelet transformation;

said quantized wavelet coefficients having a value above a predetermined threshold value to provide a quantized series of wavelet coefficients; and

said quantized wavelet coefficients each being represented by a number of bits not greater than a number of bits representing individual data elements of said data file].